Effect of Multiple Interactions on Tracking

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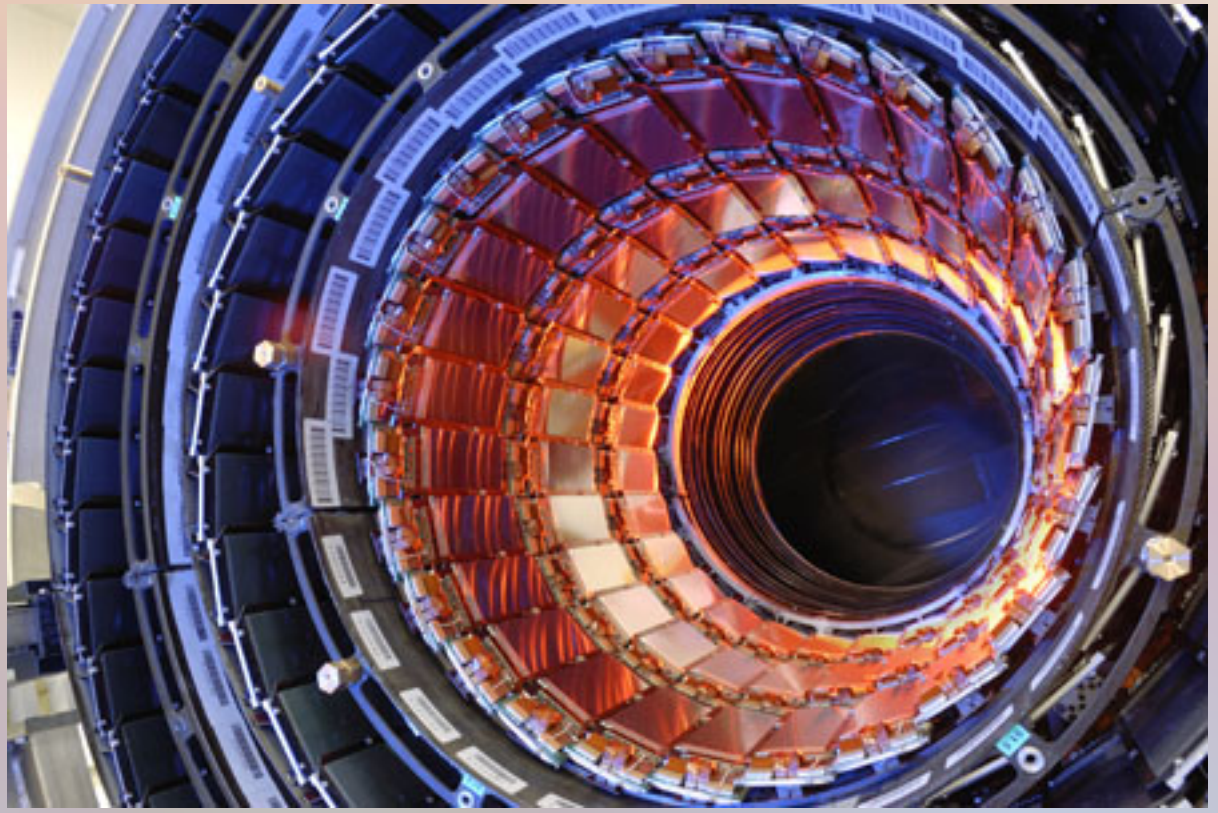


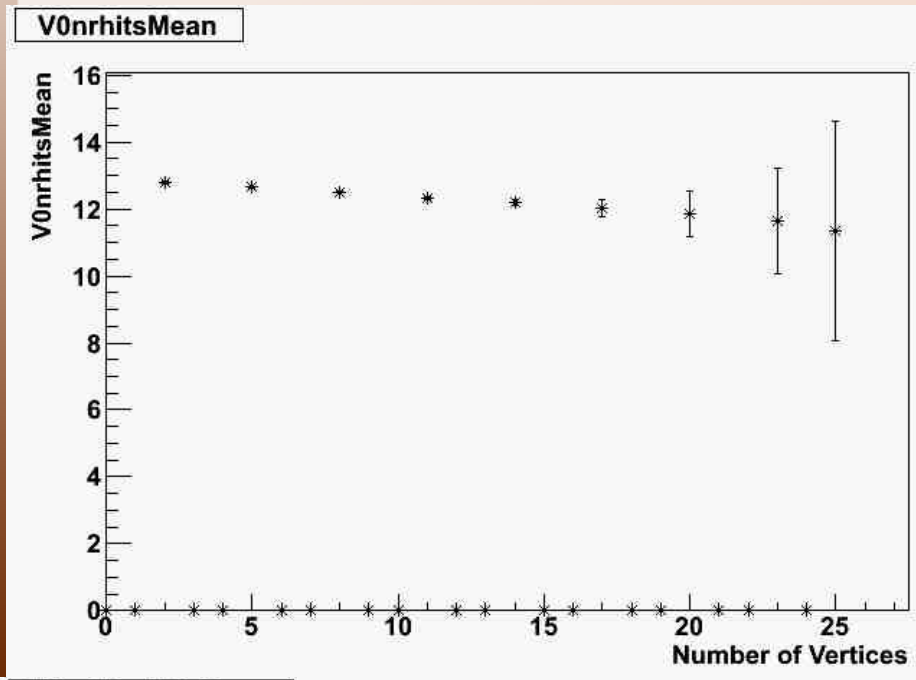
Pile-Up at CMS

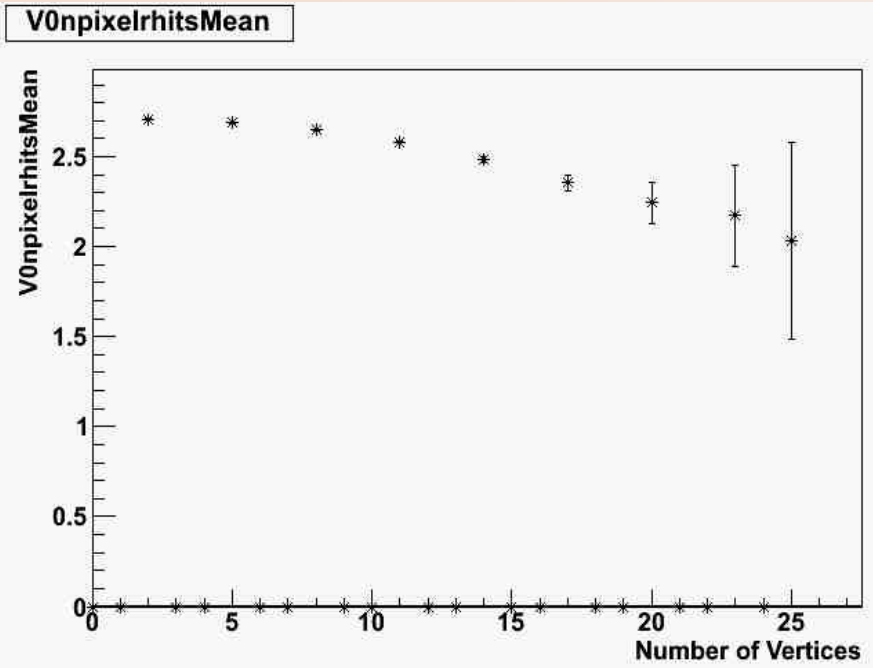
- Multiple Interactions per bunch crossing
  - Up to 25 Vertices
- Is the Tracker Still Doing Its Job?
- Study Using K-shorts in MinimumBias data

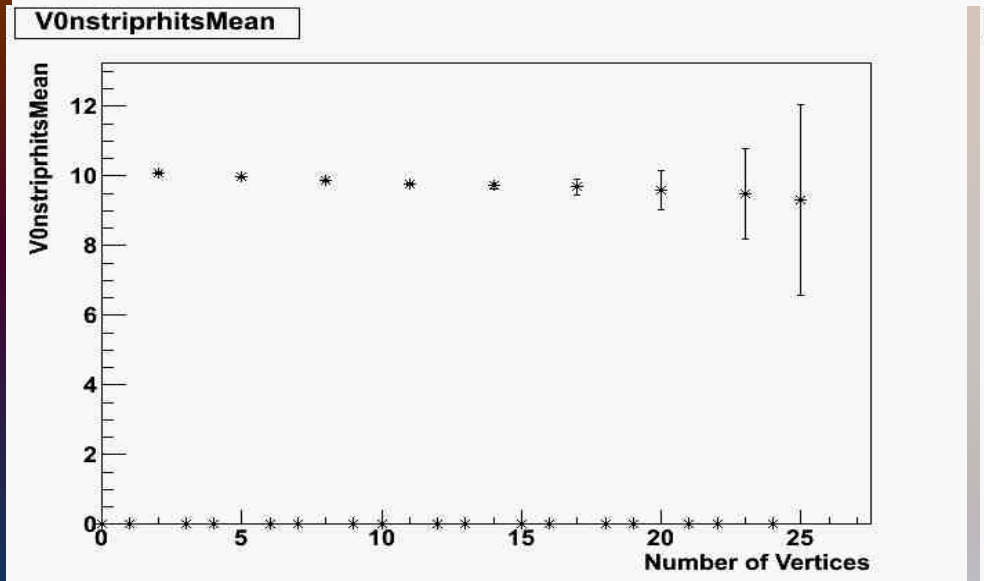
Selection and Analysis

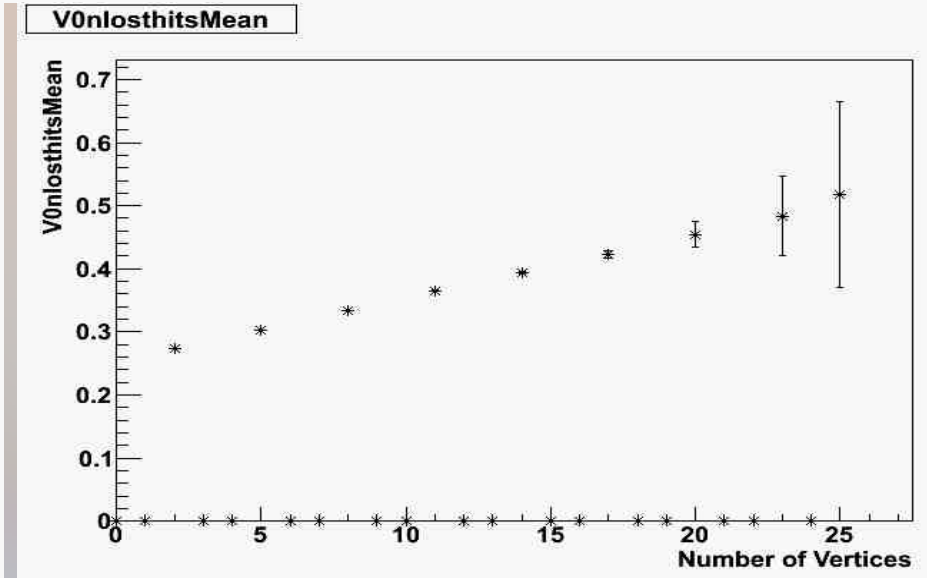
- Ran over a large run of MinimumBias_v4
  - 5 Million Events
- Using a filter, select events based on number of vertices
- Analysis path: HLT Selection, Bit Selection, K-Short reco, K-Short track reco, Vertex Filter, K-Short Analyzer, Track Analyzers
- Ran same path for 1-3 Vertices, 4-6 Vertices, etc.

Results : Hits



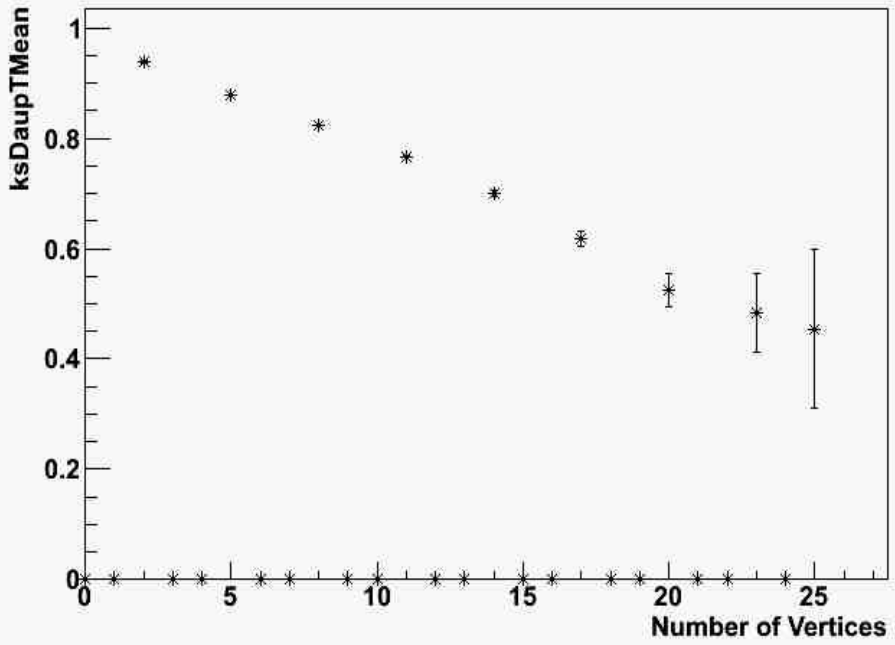




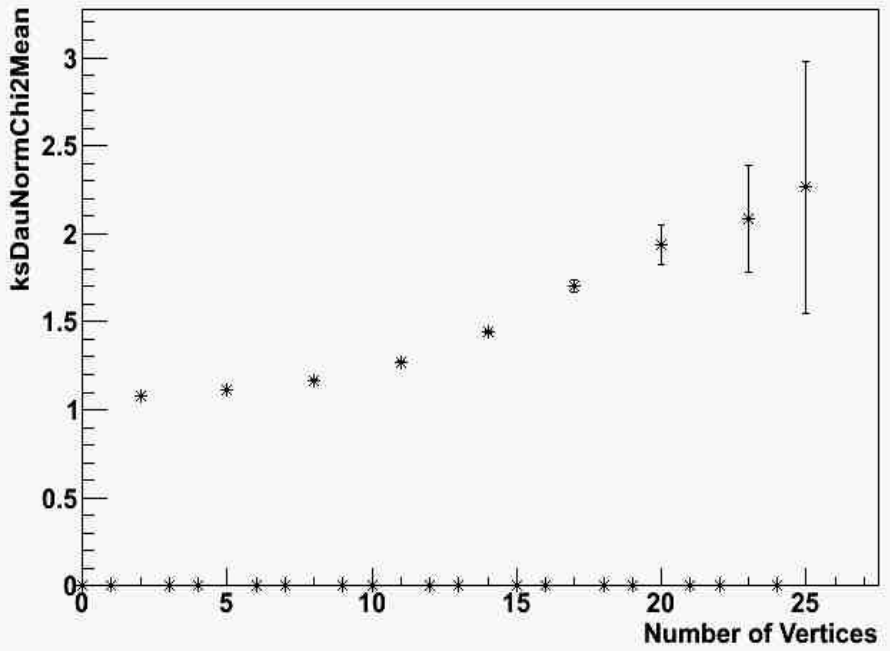


Results: Pt and NormChi2

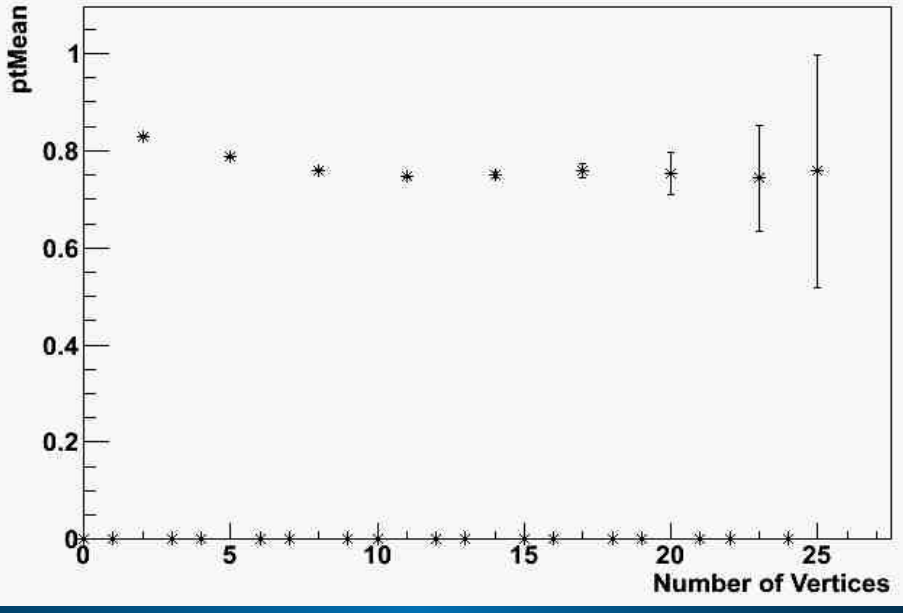
ksDaupTMean



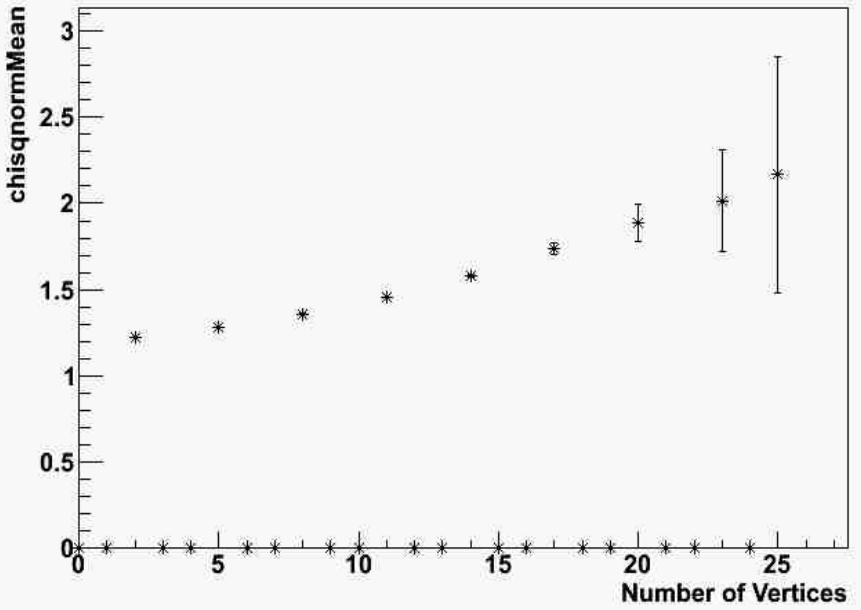
ksDauNormChi2Mean



ptMean



chisqnormMean



Conclusions

- Higher Pile-up has more lost hits, with greater effect in pixel layer than strip layer
- Track Pt decreases with pile-up, but more sharply for K0's than generalTracks
- NormChi2 increases in both cases with increasing pile-up
- Looking Ahead
  - K0 Signal vs Vertices
  - K0 Background vs Vertices
  - Signal to Background vs Vertices

Fun and Thanks

- Patrizia Azzi, Andrea Venturi, Mike Hildreth, Kevin Stenson
- UMichigan REU Program

References

CMS Site

- Collaboration
- Public